00:00:27 PAT: Good morning, and welcome to the Department of Energy’s Tools for Building a Better Grid webinar. We launched the building of a better grid last month to catalyze the nationwide deployment of new and upgraded high-capacity transmission lines in order to achieve President Biden’s goal of 100% clean energy by 2030 and net-zero by 2050. Through this initiative, we also strive to make the U.S. power grid more resilient. We understand that building transmission is a difficult process, but this is going to be a holistic endeavor and a partnership.

 To kick off this event, I would like to introduce a very special speaker: Secretary of Energy Jennifer Granholm. As a former governor, Secretary Granholm was passionate regarding the importance of this work and state partnerships that are necessary to achieve success in transforming the nation. Welcome, Madam Secretary.

00:01:35 SECRETARY GRANHOLM: There we go. Thanks, Pat, so much for the kind introduction. Welcome, everybody, to our very first Building a Better Grid webinar. This is really the first of many opportunities that we at the Department of Energy are taking to engage with folks all over the country who are involved in the transmission system. So, we got a lot to discuss. You know, this administration does have very big plans for transmission as part of the President’s climate and clean energy agenda.

00:02:08 Just a friendly amendment, Pat, we actually want to cut emissions in half by 2030, reach 100% clean electricity by 2035, and then achieve net-zero by 2050. And all of our success is going to start with the foundation which is the transmission capacity. We obviously need more, more, more transmission to run on 100% clean energy, including wind and solar and hydro and nuclear and geothermal, and to handle all the buildings and the cars and the trucks that we’re working to electrify.

00:02:42 So, we have to expand capacity. We need more transmission to give more Americans access to these clean energy sources that are, I like to underscore, already cheaper and lower people’s energy bills. And of course, we do need more transmission to protect more households from power failures during natural disasters and cyber attacks as well.

00:03:06 So, in other words, we just need more transmission to deliver cleaner and cheaper and more reliable and more resilient energy and not to mention, to create more jobs. There are already, what, a million Americans working on transmission. If we want more transmission, we’re going to need more electricians, and more truckers, and more construction workers, and more line workers, and on and on and on.

00:03:32 Fortunately, the bipartisan infrastructure law that was just passed, that invests over $16 billion dollars to upgrade the grid. And that money, along with DOE’s existing authorities, that’s going to help us to add more transmission lines and to just make our grid fit for the twenty-first century. I totally know there are big challenges to this. Obviously, you all know transmission projects span multiple jurisdictions often and each of those with their own set of concerns and priorities, but we have the tools and we have the expertise to come up with plans that actually meet local goals.

00:04:18 And we’ve got a foot in the funding and permitting that can turn those plans into towers and lines. And all that’s missing is you. So, at the core of our Building a Better Grid initiative is really stakeholder engagement. We want these new transmission lines to have collaboration and communication in their foundation, at the beginning so that they can meet local needs and help communities nationwide achieve their energy goals and that means we have got to bring folks to the table, folks like you, and that’s why we’re starting with this webinar.

00:04:58 So, today you’re going to learn more about the awesome resources that DOE is bringing to bear on this front. You’re going to meet the folks who are leading our Building a Better Grid initiative and you’re going to learn about the teams that we have working on this. And then together, we’re going to kick off some of the essential discussions that are going to form the basis of our efforts. We are super excited to hear your thoughts on how we can navigate this road ahead. We’re especially interested in your input on the rest of the Build Back Better agenda, which is going to invest hundreds of billions of dollars in clean energy projects, and it’s going to allow us to jam on the accelerator on our transmission deployment.

00:05:43 So, as the saying goes, this could be the start of something beautiful. So, let me thank you all, again, for joining us, and not just on this webinar, but in this effort to build a modern grid and to deliver clean and resilient and affordable power to all Americans. So, with that, it is my pleasure, I think I am to turn it over to today’s facilitator, if I’m not mistaken, Pat, and that is Meredith Braselman. Is that right?

00:06:11 MEREDITH: That is correct, Secretary Granholm. Thank you so much for joining us today. We appreciate it. So, ladies and gentlemen, I am Meredith Braselman with ICF. I’ll be your MC for today. We do have a few housekeeping items that we want to go through before we get started with the rest of the program. This WebEx is being recorded and may be used on DOE’s website or used internally. If you do not wish to have your voice recorded, please do not speak during the call. If you do not wish to have your image recorded, please turn off your camera or participate by phone.

00:06:41 If you speak during the call or use a video connection, you are presumed consent to recording and use of your voice or image. If you have any technical issues or questions today, you may type them in the chat box and send to the host. We have muted your lines upon entry, and they will remain muted for the duration of the call. We are taking questions today, and you may submit your questions throughout the event using the Q&A or the chat functions. And we will have an opportunity for each of our speakers to answer questions after they present today as well as a longer Q&A at the very end. If you need to view the live captioning, please refer to the link that just appeared in your chat.

00:07:21 So, now I want to introduce our first speaker, Alejandro Moreno. Alejandro is Deputy Assistant Secretary for the Office of Energy Efficiency and Renewable Energy, also known as EERE. So, please join me in welcoming Alejandro.

00:07:36 ALEJANDRO: Thanks, Meredith. And many thanks to Pat and Michelle and the entire Office of Electricity team for inviting me here today. As you’ll see, there’s really deep connections between the work that we do in EERE and the Office of Energy Efficiency and Renewable Energy and the Office of Electricity, and the two combined really are needed to build a better grid..

00:08:03 I’m the Deputy Assistant Secretary for Renewables within the Energy Efficiency and Renewable Energy Division. So, we have three major pillars: one focused on transportation, one focused on efficiency, and one focused on renewable power generation, mostly with some direct heat as well.

00:08:36 What I’m going to do today is set a little bit of the stage, both talking about why transmission is so important. You heard from the secretary earlier, it’s a key priority for the administration and a key tool to accomplish the goals that you heard, the decarbonization goals that you heard, and also talk a little bit about the work that we do in DOE on the generation side. Again, both the generation side and the grid side work very closely in partnership, and both are critical to getting the power system goals that you heard.

00:09:07 Very briefly, EERE, our mission, as you see here, you heard from the Secretary and from Pat, is to help achieve a carbon-free electricity sector by 2035 and equitably transition the country to a net-zero greenhouse gas emissions economy by no later than 2050. Within EERE, we have five big—sort of—decarbonization priorities and pillars, and you see those on the right there.

00:09:32 One is around the grid. Decarbonizing the grid. The second is decarbonizing energy intensive industries. The third is decarbonizing transportation across all modes, both road, rail, maritime, air. The fourth is reducing the carbon footprint of buildings. And the fifth is enabling a net-zero agriculture sector. No surprise, if you’re familiar with the traditional breakdown of the major categories of large economy-wide emitters, it’s those five categories right there.

00:10:02 Equally important is, as you see the word in the mission statement, equitably transitioning America is recognizing that as we achieve those decarbonization goals, doing so in a way that is equitable, creates good jobs, ensures thorough representation from all different groups, including traditionally disadvantaged groups in STEM and in careers that will be continued to build through the clean energy transition. And that we do so hand-in-glove with our state and local partners, both state and local governments as well as community groups, recognizing that the transition that we’re talking about here, the infrastructure transition, is one that’s only going to work and it’s only going to be equitable if it is designed and owned by the people who live with the infrastructure every day.

00:10:53 EERE, we, in my pillar, in renewables, we’re broken into four programs and a separate group that I’ll talk about, those four programs correspond to the four major renewable power technologies: solar, including both PV and CSB; geothermal; wind both onshore and offshore; and water power, which is really both, it’s a combination of hydropower technologies and green energy technology.

00:11:21 We also are a partner with the Office of Electricity in the grid modernization initiative. We just focused on a number of priorities that will be very familiar I think to anyone listening here today, and I’ll talk about that a little bit at the end. The next slide.

00:11:37 Very clearly, you heard this from the secretary, but there are a number of ways in which we can get to a fully decarbonized power sector and eventually a fully decarbonized economy. All of them require a lot more renewable energy on the grid than we have today. What you see here is one scenario that actually only gets up to about 95%. It’s a study that was released last year called the Solar Futures Study. We’re continuing to update these numbers specifically with a 100% target, but even getting to 95% requires upwards of 1.5 to 3 terawatts of new wind and solar and similar amounts of new batteries on the grid.

00:12:15 There are a lot of variables here. Again, this is just one scenario, but all of the scenarios require considerable amounts of new generation, far more than we have today, and major annual increases in how much gets deployed each year, up to four or five times more than what we’re seeing today for wind and solar. It’s also really critical to recognize that this need for continued accelerated growth doesn’t stop at 2035 because of the additional load that comes on from electrification of transportation, electrification of industry, and buildings, we need to seek continued growth all the way through 2050 of new generation, of new clean generation only.

00:12:57 Next slide. At the same time, it’s not just the amount of generation that may change, but it’s the timing and the profile of load, both of course from changes in wind and solar, where we start to think less in terms of overall more in terms of net load. At the same time, electrification itself is likely to have pretty profound changes on the patterns and the profiles of the load, not necessarily in ways that we are quite ready to predict yet. Just one example here is because of the big shift of heating to electrification, we may well see the overall peak, instead of being driven by summer afternoons—as it is in most of the country right now, due to air conditioning loads—it may actually shift to winter mornings.

00:13:42 And what does that mean for overall capacity and for operation of the system? These are big questions that we’ll have to answer, and it’s just one of many types of changes we may see. A lot of what we’re doing right now, in partnership with the Office of Electricity, is trying to understand what some of those patterns may look like under different scenarios, and what are the tools that we have to better predict them, and to ensure that we’re continuing to operate the system as affordably and reliably as possible through those changes.

00:14:10 So, the work that we do in EERE, this is some of the work that’s really common across those four major technologies that we have. The first is really focusing on accelerating deployment of the technologies we have. That includes looking at things like market barriers, improving siting, some of the environmental concerns around wind and solar, developing new technologies, and better information, better science around that.

00:14:33 And really working closely both with communities and with those who are in charge of making the decisions about what infrastructure looks like, where it goes, how big it can be, where it connects, to ensure that people have the information that they need and that the processes are designed in a way that is going to facilitate the deployment of the technologies, again, that we have.

00:14:55 The second big pillar is around cost reductions. That’s traditionally been what EERE focuses on, reducing the cost of wind, reducing the cost of solar. We’ve had a considerable amount of success, but even though you hear more and more about wind, land-based wind, and solar PV being cost competitive, we still need to bring down the cost to make sure that it is truly cost-competitive everywhere around the country, not just in high-resource areas, so that anywhere in the country has a truly cost-competitive option for zero-emitting generation, hopefully more than one.

00:15:26 The third and fourth I’ll sort of bundle together. They’re slightly different, but they’re really the focus of our partnership with the Office of Electricity. Ensuring that the grid is reliable and resilient as we get more generation online that has pretty different properties than what we see today. So, both that it’s intermittent, it’s variable, and that it’s largely power electronics driven rather synchronous.

00:15:47 So, I tend to think of this in two areas. One is really maximizing the flexibility and grid services that we can get out of our generation in our load, including storage. The second is really supporting the overall modernization and the expansion to the extent that we need it, again, a big conversation today, of the grid itself. And the last is really, really important as well. All of this needs to be done while making sure that as we develop and utilize new supply chains, new sources of materials, that those are secure, that they are diversified, they are not vulnerable to single points of failure.

00:16:22 We’ve seen pretty notable examples of that, for example, in solar floatable tank space. And at the same time, we create as many good-paying jobs throughout the entire supply chain, the manufacturing, the operation, of these technologies as possible in the U.S. So, next slide.

00:16:44 I will take a couple minutes just to talk about the grid since this is the topic of the conversation today. We have the Grid Modernization Initiative that I mentioned early on; this is the partnership between EERE and the Office of Electricity focused on four major goals that you see on the right: decarbonization, ensuring affordable, modern infrastructure, ensuring that that infrastructure is resilient, both to climate and to other man-made threats, and that it is equitable and, in particular, addresses some of the environmental justice concerns that are such a high priority for all of us.

00:17:21 There are four sort of ways of getting there, I think is the official term for term for that, on the left. One is really focusing on renewable energy integration, what I just talked about. That’s a big part of what EERE looks at. The second is looking at grid infrastructure expansion, a big part of the conversation today, and Michelle, your team focuses on. And the third and fourth, I’ve talked about as well, is ensuring that we’re well adapted for widespread electrification and that we continue to be resilient and ensure the continued and improved security of the grid, both as the grid itself changes, all the resources on it change, and the nature of the threats themselves.

00:17:57 So, a little more detail on the next slide, what type of research this actually entails. I’m not going to go through all of this. But, if the big conversation today that we’re going to talk about is transmission, what you see here is all of the other parts of the power system that we’re working on, the grid itself, to help modernize. These are almost entirely parts of work that cut across multiple different offices within DOE.

00:18:21 As any good government organization, we are organized in silos, but we have done, I think, a really tremendous job over the last few years in cutting across those silos, breaking them down, and creating meaningful, topical, critical pieces of work. Getting the best expertise from across all the different offices within EERE, within the Office of Electricity, for example, whether we’re focused on improving specific technologies and devices, like HVDC and power electronics, or we’re focused more on operations and planning, some of the actual processes and the tools that go into those, working directly with utilities, or working with regulators, transmission operators to understand the impacts of different markets and policies.

00:19:06 All of those are elements that need to be optimized differently when we look at a grid that is going to look substantially different from the one that we have today or at least has elements that function quite differently.

00:19:18 So, last slide, just points of contact. Recognizing that the work you see here that I’ve talked about, the work that you will hear Michelle talk about, you’ll hear Michael talk about later today, this was all done in deep partnership across the department. Michelle’s team leads transmission, Michael’s team leads the grid research, my team leads the renewables research, but a lot of the key work today really cuts at the intersection of all of those, and we work really closely together to make sure that it gets done effectively.

00:19:46 And to partner with many, many hopefully of you that are on the line today from the private sector, from civil society, from research institutions as well. Without you doing that work, none of this actually gets done. So, thanks again for the invitation today. I’m really looking forward to the rest of the conversation. And here you’ll see the key contact points within EERE. Feel free to reach out to any of us at any point if you have questions. We’re happy to make sure that we put you in touch with the right people to answer them. So, thank you.

00:20:18 MEREDITH: Alright, thank you, Alejandro. We do have a few questions that people have submitted. Let’s see. The first question here: Transmission takes about five to eight years to build due to permitting, capital, siting, engineering—that kind of thing. How is DOE expediting the process by easing red tape measures or enabling interregional planning?

00:20:47 ALEJANDRO: That is a question that is squarely in Michelle’s group. If she wants me to take a crack at answering it, I’m happy to, but I would certainly defer to her.

00:21:00 MEREDITH: Let’s see here. There’s Michelle.

00:21:04 MICHELLE: Hi. I was chuckling there, Alejandro, to see what you would answer. So, I’m going to answer this a little bit differently just because of the wording and that stuff. So, the environmental review is necessary and making sure we’re electrically viable, environmentally sound, and everything. So, I think what we do is make sure the processes are as efficient as possible.

00:21:29 And some of the things we’re doing at DOE is setting up kind of partnerships with our other federal agencies, looking at our processes, looking at the review processes, and making sure that we can make them as efficient as possible. So, I’d say it’s not going to magically go away because there is, you need to do these reviews, but I do acknowledge though that making sure that, as you go through each of the federal entities, that we actually look at things and make sure it is efficient, is the part that we are doing our job to make sure our processes match up on the federal side to make it as easy as possible.

00:22:16 MEREDITH: Very good. Another question here. How does DOE examine the environmental impact on land needed for things like solar installations?

00:22:30 ALEJANDRO: That’s squarely in mine. It has traditionally been a very big part of our wind program where some of the environmental impacts and tradeoffs they’ve been long known and certainly the research needs around them have been quite clear. Solar, we’re starting to build that up more. I think what we see on the solar side is that a lot more of the impacts are cumulative.

00:22:56 And so, being able to both develop the science, further the science around that, understanding the translation of different configurations, how they interact with different habitats and species at different scales, a lot is yet to be known. But then being able to translate that information to the people who actually need it to make decisions, whether communities or the various state and federal regulatory agencies, is sort of the second step there.

00:23:24 That’s something we learned really clearly from our experience in both some of the hydropower work that we’ve done and wind is that there are two steps. One is really ensuring that we have the best information possible. The second is then ensuring and proactively making sure that that reaches the people who need it for their decisions in a very clear, usable way.

00:23:46

00:25:04 MEREDITH: Can you describe what the new green transmission grid will look like? What will it have that today’s grid does not have? I’m especially interested in the physical makeup.

00:25:21 ALEJANDRO: Again, I would defer more to Michelle for that. I’d simply say I think it does–certainly expanding transmission is one of the most affordable ways to get to the level of decarbonization of the power grid that we’re talking about from a generation side. It effectively makes the numbers that we have to reach, the capacity numbers for new wind and solar go considerably down. And that economic tradeoff is one from an economic perspective, that is, from the modeling we’re seeing, is a very good one. It’s a very economic one.

00:25:57 That’s maybe not as precise a technical answer as to what features the new transmission would have, but for that I would defer to Michelle.

00:26:04 MEREDITH: Okay, very good. Alright, well we have come to the end of our time here with Alejandro. We will try to get back to some more questions a little bit later. So, thank you, Alejandro, so much for joining us.

00:26:16 ALEJANDRO: Thank you.

00:26:18 MEREDITH: Our next speaker is Jigar Shah. He is the Director of the Loan Program Office at the Department of Energy, also known as LPO. So please join me in welcoming Jigar.

00:26:38 JIGAR: Thank you very much for having me. The goal of my presentation is really to talk through with you some of the nuances of how the Loan Programs Office works and how it actually helps to facilitate the transmission. I think that what you’re hearing from many of my colleagues here at the Department of Energy is that transmission is a huge priority for the Department of Energy and the U.S. government as a whole, but the nuances here really matter, and those nuances are actually holding up projects from moving more quickly.

00:27:19 So, I think at the core of the Loan Programs Office is we’ve got about $40 billion dollars of resources in loan authority to give to projects. Transmission is generally not hard to finance. So, most transmission lines don’t really need to use our office. The ones that are most in need to use our office are the ones that are the long lines that are the hardest to construct.

00:27:45 And the reason for that is because most of those lines take, let’s call it, four years to build, and it doesn’t make any sense to sign a power purchase agreement for the generation that’s on one side of the line until the line is probably a year and a half away from getting constructed.

00:28:07 So, as a result, the banks don’t want to fund the line because they view as not contracted, but I think based on all the great work that we do at the Department of Energy, we all know that it will be contracted once it’s constructed because it’s a main link between very good clean energy resources and the population center that wants the additional electricity.

00:28:32 And so, that is something the Loan Programs Office can uniquely do. We can use the 10,000 engineers and experts and scientists at our national labs and within Department of Energy to validate these complex situations. And if we do validate them, then we can provide a loan at very low interest rates, usually approaching 2% for up to 30 years to be able to unlock these projects where heretofore they’ve been slowed down because the commercial markets have said that until the lines are fully contracted, they’re not going to come in.

00:29:13 And so, we have done a lot of great work there. In general, just to zoom out, the Loan Programs Office really helps projects along the bridge to bankability, which is shown here. So, we find that at the Department of Energy, there’s just a huge number of proven innovative technology that is not deployed at scale. And usually, there’s a few milestones along the way.

00:29:40 The first one is the first-of-a-kind deployment,

 which requires applied engineering. This is difficult to find. Applied engineering is very difficult because it involves derisking when a project has never been built before. You see a lot of those resources at places like Bechtel or places like the oil and gas industry.

00:30:04 The second milestone is really figuring out how to replicate that first project over and over again. And this is where you’ve got EPC contractors. As it relates to transmission, the United States really doesn’t have experience on installing HVDC lines, for instance. And so, as much as we’ve talked about HVDC lines in other parts of the world, the U.S. has had very limited experience there.

00:30:30 And so, for most HVDC lines you still view them in milestone one or milestone two, albeit with support from very large companies like General Electric or Siemens. These are still viewed as not fully mature technologies for the contractors here in the United States.

00:30:49 The third milestone is really commercial scale-up. And that’s really the learning curve, that’s when you get the establishing demand. You’ve got six cumulative doublings of experience and you get the cost way down, right, and so many folks have heard that in the solar and wind space. In the transmission space, there are a lot of technologies around super connecting cable or smart wires or dynamic load ratings or other things that we can fund out of the Loan Programs Office that would dramatically reduce the cost of these technologies as they come to market.

00:31:21 And then the fourth milestone is really commercial debt market education, which is really figuring how we take this unique ability that we have to finance merchant deals, and then using the expertise of the Department of Energy, and really get the commercial markets comfortable doing that without us, right.

00:31:40 The goal here is not to have all of these projects go through the Loan Programs Office; the goal is for us to be a catalyst, and then to transition the responsibility for the full scale-up to the private markets and achieving full market acceptance, which I think the Loan Programs Office has done very successfully in utilities to scale, solar and wind, EV manufacturing, battery manufacturing, but we now have a number of additional sectors, including transmission, that need this service to get to the next level. With that, I’m happy to take questions.

00:32:21 MEREDITH: Alright, thank you so much. So, we have one question. Are Canadian companies able to participate? Will there be a bidding process or supplier registration? And what is the timeline for engagement?

00:32:35 JIGAR: Yes, great question. So, anyone can apply. So, Canadian companies, Korean companies, Japanese companies. So, the assets themselves have to be in the United States. And so, the project has to be here in the United States. And depending on the different pots of money that you’re using, like for LPO specifically, we require you to pay Davis-Bacon wages, which isn’t a problem in transmission given how specialized that is.

00:33:10 And then depending on whether you’re using money from the IIJA, you have certain buy American provisions and other things that may apply, but the Loan Programs Office doesn’t have those requirements by definition. It’s really if you’re using other resources within the IIJA that those start to kick in. In terms of time frame, transmission takes longer through our office than other projects. So, I’d say for the average project that’s really well prepared for the office, it’s sort of a six-to-eight month process.

00:33:49 For transmission, it usually takes between a year and a year and a half. And the reason for that is because the need per process is quite involved and, you know, a long process. So, what you find is that transmission projects just come to us earlier in their cycle so that, you know, we’re not an impediment to their schedule.

00:34:12 MEREDITH: Alright, thank you. So, our next question. Are there loan programs for organizations to come up with ideas and projects to protect our power grids from cyber attacks?

00:34:23 JIGAR: Well, the Loan Programs Office is really focused on innovation, which those items would be innovative, and greenhouse gas emission reductions. And so, I’d say a lot more of the cyber attack work is covered in grant programs or the programs that are run by the Office of Electricity, but we certainly require high levels of cyber security awareness in all the projects that we do approve for the transmission lines and others that we approve.

00:34:55 But, we don’t finance cyber security in and of itself because it doesn’t have a greenhouse emissions savings by itself.

00:35:05 MEREDITH: Okay. Next question. How should transmission providers and/or RTOs, ISOs, consider a DOE loan guarantee as part of their transmission planning processes?

00:35:17 JIGAR: Yeah, it’s a great question. So, I think there’s a couple of ways of thinking about it. One is what I described earlier, which is that there is a persistent problem in transmission today because most utility companies, particularly for the long lines, don’t want to rate base these lines, and the public service commissions certainly don’t want to because they believe that some states benefit more from these lines than others.

00:35:45 And so, you find yourself in a place where the lines are merchant lines. And if they’re merchant lines, then you also have this challenge. And so, so, one of the main ways that we’re assisting is really by breaking this chicken-and-egg situation by being able to fund a merchant line that is not contracted. And so, that usually solves a lot of problems for RTOs, ISOs, utilities, and clean energy generation developers.

00:36:19 So, that’s one thing that we do. The other thing that they can do is that in some cases, the established rules around cost of capital is a 50% equity, 50% debt ratio. And so, if people use our money, we can get up to 80% debt, and then that reduces the impact on rate payers for the 20% equity that’s put into the project. And so, some folks that have persistent rate increases that they’re experiencing that are quite concerned about them are looking to use our office as a way to increase the amount of debt that they can use on projects within their rules for the public service commissions.

00:37:03 MEREDITH: Okay, thank you. What do you see is DOE’s next steps with assisting HVDC lines?

00:37:12 JIGAR: Well, as was said previously, there’s other parts of DOE that might be able to answer this question, but we are working closely on HVDC lines that have applied for a loan at the Loan Programs Office. The United States of America still doesn’t have a dedicated center of excellence for HVDC. And so, we are at risk for not having enough experts here in the United States. And so, we rely on the experts at GE, at Siemens, there’s a couple of centers of excellence in Europe and in Canada, mainly because they were created out of HVDC lines that were built.

00:37:56 And so, that is something that we need to do here to be able to make sure that we can keep up with. Right now, we probably could do two HVDC lines simultaneously; we’d like to be able to do four or five simultaneously.

00:38:14 MEREDITH: Okay. What do you think about community choice aggregations, CCA, as a partner for scaling up commercializing technologies, both for larger, community-scaled generation storage and for retail electric product services? Has LPO worked with CCAs in the past?

00:38:32 JIGAR: Yeah. So, we’re talking to most of the CCAs, both in New York and in California, today mostly, there’s a couple of other states that feature them. I would say that the CCAs currently are doing very traditional power purchase agreements or contracts for differences for renewable energy to be able to prove to their customers that they’re serving them with clean renewable energy. There was a big event yesterday, I think, with Pattern Energy in New Mexico that was, I think that clean energy is being purchased by East Bay CCA. So, you know, that’s wonderful work.

00:39:09 But, I’d say that where we’re working more closely with the CCAs is on helping their customers with physical concerns that they have, right, whether it’s power safety shut-offs where they’re putting in natural gas or diesel engines, which are far less cost-effective than other solutions, or they are putting in other local infrastructure to accommodate higher penetrations of electric vehicles and things like that.

00:39:38 And so, there’s a lot of technology here at the Department of Energy, from smart panels in homes to distributive energy resources to demand flexibility programs and others that the CCAs are just now starting to support their customers with.

00:39:58 MEREDITH: Okay. A few more questions here. Is this limited to power transmission projects, or can the LPO support the early deployment of grid support technologies aimed at improving grid safety or resilience?

00:40:12 JIGAR: As I maybe answered previously on the cyber security question, the project has to save greenhouse gas emissions. So, for instance, if you were improving resiliency of the transmission grid by adding dynamic load ratings and smart wires and other types of technology to improve the asset utilization of our existing transmission grid, while adding some of these other benefits, then that is allowed because you’re by definition increasing the amount of transmission capacity which then could carry more clean energy.

00:40:48 But, if it’s simply providing resiliency or simply providing cyber security or other things without increasing the capacity to transport clean energy and thereby reduce greenhouse gas emissions, then it would have to be served by another part of the Department of Energy.

00:41:06 MEREDITH: One last question for you for now. Are there opportunities for RTOs to take advantage of funding from the Loan Office?

00:41:17 JIGAR: Well, we need to work with the borrowers of the capital, right? So, the RTOs, we are working closely with them now, particularly on the integration of offshore wind into the RTOs, and they have a lot of technical questions because most RTOs are very used to radial lines and are not very used to the HVDC lines that are going to be required to integrate offshore wind into their systems.

00:41:45 But ultimately, the borrower may not be the RTO, but may be a private-sector entity that’s seeking permission or working with the RTOs.

00:41:57 MEREDITH: Alright. Thank you so much, Jigar. We really appreciate you joining us today. Like I said, we may have some more questions here at the end. But we are going to switch over now to Erin Green. Erin is attorney-advisor for the Western Area Power Administration, also known as WAPA. Please join me in welcoming Erin Green.

00:42:23 ERIN: Wonderful, thank you. I’m Erin Green, an attorney-advisor for the WAPA Transmission Infrastructure Program. A brief background on WAPA. We’re one of four power-marketing administrations within the Department of Energy. WAPA markets and transmits wholesale electric power generated from 57 federal dams, over 17,000 miles of high voltage transmission in 15 states.

00:42:49 Our service territory covers a large portion of the Central and Western United States, and we serve more than 700 wholesale customers, ranging from rural electric cooperatives to municipal utilities to Native American tribes. WAPA also operates three balancing areas and one sub-balancing area. We’re a member of the Southwest Power Pool and the Eastern Interconnection, and we participate in the real-time markets in both the Southwest Power Pool and the California ISO in the Western Interconnection.

00:43:21 Since 2009, WAPA has had borrowing authority of up to 3.2—I’m sorry, next, next slide, please.

00:43:33 Since 2009, we’ve had borrowing authority of up to $3.25 billion dollars to facilitate the development of transmission to support renewable energy development. Specifically, WAPA can use these funds to finance or develop new or upgraded electric power transmission lines and related facilities with at least one terminus in WAPA’s service territory.

00:43:59 The keys here are the newer, upgraded electric power transmission lines and related facilities and a required factor that the facilities deliver or facilitate the delivery of renewables. As I mentioned before, WAPA has a 15-state service territory, and while this program authority requires a terminus to be within that service territory, it does not require any new transmission to interconnect with WAPA’s system or have the entirety of the project lie within our service territory.

00:44:33 You’ll also see here there are five key components of eligibility for participating in TIP’s program. Any project that TIP participates in or supports financially must demonstrate a reasonable expectation of repayment, not adversely impact the transmission system, and be determined to be in the public interest. There are additional requirements in the statute that clarifies the source of funds for repayment to be from the project revenues.

00:45:02 These provisions help keep TIP projects separate from WAPA’s traditional power-marketing program and wall off WAPA’s core power-marketing programs from the TIP activities.

00:45:19 There are two types of assistance available from WAPA TIP, both financing and project development. Project developers may apply to WAPA for financing for a preconstruction loan for eligible development costs or a construction loan or a term loan. TIP aims to maintain a balanced portfolio among our loan products and the project types. So, in terms of project types, that would include intrastate transmission and renewable interconnection, interstate transmission, and other technologies, including energy storage.

00:45:56 TIP’s website provides specific information required for a loan application. And it is important to note that WAPA does require advance payment of amounts to cover costs to evaluate loan applications and for outside advisors to assist TIP in these evaluations. We’ve already heard a little bit of discussion about NEPA, and I also need to note that financing is a federal action that does implicate NEPA.

00:46:23 So, NEPA is indeed a requirement for any project involving financing from TIP, but the type of NEPA action could vary depending on the nature of the project. In terms of project development, WAPA has expert resources in-house to assist developers in development or completion of environmental, technical, commercial analytics prior to applying for financing.

00:46:49 In this case as well, developers are required to advance funds to cover WAPA’s cost in providing this development assistance. Our website also provides information about the steps required to engage with us for development assistance and specific costs. Alright, next slide, please.

00:47:08 WAPA is a desirable partner for developing infrastructure as this is what WAPA actually does at our core. We build, maintain, and operate transmission in multiple states, and we market that power. We have engineers, NEPA teams, archaeologists, and power marketers, and interconnection and tariff experts. So, we can’t provide benefits beyond those available with commercial lending institutions in addition to our more favorable cost of debt.

00:47:37 Three key areas I’ve highlighted here where WAPA provides value are in the NEPA process. [unclear] to siting and permitting determination, which are indeed particularly valuable in the West, with our more expansive federal lands. Our TIP team has experience developing and financing projects through all project phases. And we can also leverage our in-house expertise to assist developers through the engineering and PATH rating, interconnection processes, marketing analytics, in addition to our experience with stakeholder engagement.

00:48:12 So, on the next slide you’ll see our contact information for the project, excuse me, for the program. We do invite you to contact us for additional information. Please see our website for specific steps and guidance relating to development assistance and available financing products. And with that, I’ll be happy to take any questions.

00:48:34 MEREDITH: Thank you so much, Erin. So, first question here. How many projects have successfully gone through TIP to date?

00:48:42 ERIN: Well, I’d say—let’s see, we’ve had one project completely built and repaid. Another project is in repayment. And we have a project where we provided a loan for development assistance that has been repaid.

00:49:03 MEREDITH: Okay. Does TIP provide federal imminent domain?

00:49:09 ERIN: I think the answer to that is it depends. We do have the capability to do that. Of course, that’s something that is exercised with extreme, extreme care in any situation, and we have not exercised it on a TIP project to date.

00:49:28 MEREDITH: Okay. Another question. Does nuclear energy meet the definition of renewable?

00:49:35 ERIN: You know, I think that would depend on if there are other federal statutes or guidance that defines that. In terms of the TIP guidance that’s been published in the Federal Register, we don’t address that question specifically. So, we would have to look to other sources to help make that determination. But I do need to be clear that we do not finance the generation facilities. So, this is primarily a transmission facilitation program.

00:50:09 MEREDITH: Okay. The next question asks if there are any statistics to understand which Western states are leading or lagging in applying for these programs?

00:50:22 ERIN: Well, we don’t currently identify that. Applications for funding typically come in—and I should say financing. WAPA is a financing program. We do not have grant funding. The applications come from specific developers rather than the state or local government entities, in most cases.

00:50:48 MEREDITH: Okay, very good. I think that concludes the questions that we have thus far, Erin. So, thank you very much for being here today and joining us and answering some of these questions. Next up we have—our next set of speakers are from the Office of Electricity. We’ll hear from Pat Hoffman, acting assistant secretary; Michael Pesin, deputy assistant secretary; and Michelle Manary, acting deputy assistant secretary. So, please join me in welcoming Pat, Michael, and Michelle. And I think, Pat, you are going to lead us off this morning.

00:51:24 PAT: I’m going to lead us off again? Great. So, what I thought I would do this morning is first of all, once again, welcome everybody to this seminar. It’s very important that we talk about all the options and the tools and the capabilities that the department is looking at and really trying to organize our efforts as we emphasize the building of transmission projects moving forward.

00:51:50 We recognize first and foremost that this is a partnership and that we really need to think about how we do transmission planning, how do we look at advancing technologies on the transmission system, but also utilizing all of the mechanisms that are available. From what I would like to cover, because Michael is going to cover the R&D aspects; Michelle is going to cover the notice of intent in all of the transmission programs; what I wanted to do was just briefly cover some of the opportunities in the infrastructure bill in looking at where some of the allowances are for transmission in the infrastructure bill. And then we will go from there as part of our organization and our activities.

00:52:35 So, with respect to the infrastructure bill. There are a couple of provisions that actually do have an allowance for some upgrades and investments on the transmission, sub-transmission, and of course on the distribution system, but I know this meeting is mostly on the transmission system. And in the 40101, which we call the hardening grants, in the IIJA, the bipartisan infrastructure law has $5 billion dollars, which is a billion dollars per year in FY22 through 26 to look at hardening investments.

00:53:12 And those hardening can include upgrading or re-conducting transmission lines as part of those investments. Now, half of the investments go to the states for formula grant and the other half of the investments go to industry as part of a competitive solicitation. The things that one must remember is there is of course a 100% match cost-share requirement, there is a small utility set aside, but there is also a cap on the amount of eligible spending and that is cap-based on what has been spent, the three previous years, our hardening efforts.

00:53:50 So, why is that important? Because there is some limitations as we think about transmission lines and how much financial resources are required to build a transmission line. There are limitations there. So, as we think about the hardening grants in the infrastructure bill, you have to really look at where would that make the most impact and the most economic benefit from that perspective, so just a thought there as you read the infrastructure bill and some of these provisions.

00:54:28 The second area on the infrastructure bill is what were called resilience demos, which is section 40103.B, and that is $5 billion dollars—a billion dollars per year of FY22 through FY26—funding that’s available, and of course this is looking at innovative approaches to transmission, storage, and distribution infrastructure to harden and enhance the resiliency, reliability of the electric grid.

00:54:57 So, this allows for innovative demonstrations, allows for an opportunity to think holistically of some transformational opportunities, but the one thing in this provision is that if—it has to be done through the states, and the provision says, “By public and rural electric cooperatives on a cost-share basis.” So, the eligible entities for this provision is a state, a combination of two or more states, an Indian tribe, a unit of local government, or a public utility commission.

00:55:34 So, under this provision the eligible entities are the states. So, that’s something to keep in mind as we think about it and as we are thinking about the implementation and as people start thinking about opportunities from a funding announcement point of view. And then the last area is what we’re calling the follow-on to the smart grid grants, and that is section 40107.

00:56:02 And this is $3 billion, $600 million per year for FY22 through 26, for smart grid investment matching grants. This really is adding some additional functionalities that the program can support. So, you think about advanced controls in communications, which is the purpose of the Smart Grid Investment Grant, and you think about some of the grid enhancing technologies and capabilities, what was mentioned earlier, dynamic line rating, power flow control, allowing for communication networks.

00:56:35 These are all important parts that are in the scope of section 40107. So, it’s something to think about there as we think about and as folks analyze the infrastructure bill and the opportunities for funding. So, with that, I’m going to pause there, because there is a lot more to cover with my colleagues in the Office of Electricity, and then we can go back for questions.

00:57:04 So, good afternoon, everybody, or good morning, depending on where you are. So, thank you for having me. So, I’m going to talk about the division of Office of Electricity that is responsible for research and development. So, let’s go to the first slide.

00:57:52 So, first I want to set the stage to kind of give you a visual representation of how do we fit into this portfolio of offices and programs in the [unclear]. So, we are the Office of the Grid. So, we are responsible for the—what I call now, “electricity delivery system” or what industry calls “T&D transmission distribution.” This is the foundation, this is the platform that makes everything possible.

00:58:17 It connects your generation sources with your loads, it allows you to provide power and from where it is produced to where it is consumed. So, this is what makes the whole complicated machine, that we call the electric grid, work. And we work very closely with other offices in the department. So, you heard in the beginning, Alejandro was talking about for Energy Efficiency and Renewable Energy Office, so his division is responsible for renewable energy, and he covered it very well.

00:58:48 There’s also divisions in the Office of Electricity or EERE that works on load side, electric vehicles. So, we are working very closely with them as well. And then of course Nuclear Energy Office and Fossil Energy and Carbon Management Office. All this comes together and those mentioned already would be called GMI, Grid Modernization Initiative.

00:59:11 This is the mechanism for all offices to coordinate our activities so that we can all make sure that the future grid is capable of accommodating all possible scenarios, all possible resources. So, the electric grid, the way it was designed, and I’m sure you’ve heard it many times, it was not designed to do what we are asking it to do right now. We have way more renewable generation coming online. There was a fantastic job that was done in reducing cost of renewables as the Secretary was talking about in the beginning, but there was some challenges to bring in these new types of resources into the mix.

00:59:51 Those resources have interagency issues, they have variables. So, we need to address that. Those resources mostly inverter-based. So, when you have an inverter-based resource versus traditional fossil, which is [unclear] machinery; you lose what’s called inertia. It has a very negative impact on system stability.

01:00:10 There is many, many different challenges that we have in the deployment of distributed energy resources that creates a bidirectional power flow that the grid was never intended to accommodate. So, you have power flowing to the direction that it was not intended to be flowing. So, it needs to be accommodated, it needs to be changed.

01:00:28 And then there is completely new business models, new expectations for loss of service quality for participation of consumers in the markets. So, all these things require to be addressed. And when we talk about this delivery system, the reason I call it electricity delivery system and not transmission distribution, the line between transmission and distribution is really blurry. Those two parts emerge, and they become really interdependent to the point you can’t no longer talk about transmission without thinking about distribution.

01:00:59 So, and you only see this kind of [unclear] with the introduction of [unclear] order 22-22 when your distribution site resources can participate in wholesale markets, you will see a lot of this happening in the future, and we need to be prepared for this today. So, when we’re talking about investments in transmission, which is the topic of today’s discussion, we cannot not to think about what impacts of distribution system on the transmission and vice versa.

01:01:29 And other resources. So, when we talk about the electric grid, first of all we want to make sure that this delivery system can accommodate all of the resources that connect to this. But, on the other hand, when we’re designing those resources; we need to think about how those resources can support this delivery system and this overall grid. So, this is two ways—this is why we have such a strong partnership within the department in collaboration.

01:01:54 So, let’s go to the next slide. So, I just want to get this exercise and make people start thinking about what do they need to be considering when we’re looking to the future grid. So, next.

01:02:13 So, what we have today, and one will next. What we have today is this very tightly coupled grid. It’s very rigid. So, when you have disturbance in one part of the grid, it impacts everything across the region, across the wide area, but there is different possible scenarios where it can go in the future. The one that people will be focusing most about, at least today, is going to large-scale generation with high voltage AC/DC grids and a lot of storage. So, storage is becoming more and more important.

01:02:50 So, this is the grid that will require a lot of transmission. It will require a lot more capacity to transmit electricity from where it’s produced to where it’s consumed. But more capacity does not necessarily have to mean more new transmission. You do need to have a lot of new transmission, but you can also have a lot of opportunities to increase the capacity on the existing transmission that will utilize in new technology.

01:03:20 So, Jigar mentioned when he talked about this HVDC. So, HVDC is fantastic technology to support renewables. It improves grid stability; it improves security. The only reason we don’t have HVDC grid today is because when it was originally envisioned and designed in the late nineteenth century, there was no technology available to support bioconversion or voltage conversion for direct current. So, we ended up AC grid, but there is tremendous advantages to HVDC.

01:03:53 Unfortunately, again as Jigar mentioned, we don’t really have center of excellence for HVDC in the United States. So, we need to learn from other countries, we need to learn from Europe, we need to build capability for HVDC in the U.S. We need to create manufacturing jobs expertise. So, this is one of the fantastic technologies that will make the grid more stable, more resilient, will allow us to accommodate more renewables and energy storage.

01:04:18 So, I mentioned that new technology is coming online and newer generation sources. They have different characteristics. So, one of these is intermittency. And this intermittency requires you to have way more, what they call, flexibility into the grid. So, originally in the old days, when you were creating an electric grid, you were able to fairly accurately forecast your loads, and then you had full control more or less of your generation.

01:04:45 Today, now you need to be able to forecast both generation and loads, which means you need to add another variable to this equation. How do you support these changes? So, you need to increase what I would call the sponginess of the grid. So, the grid can accommodate changes on both sides and buffer it. So, one of the best buffers is energy storage. And we have a lot of initiatives, a lot of effort across the entire department to support energy storage.

01:05:15 We have energy storage [unclear] that multiple offices are involved. The secretary announced last year long-generation energy storage, energy earth shot, because we need the longer duration energy storage. So, those are the things that we need to focus on. But then there is another scenario that people are talking about. Next, please. One more time, sorry.

01:05:42 This is a different type of future. So, some people would say, well, you no longer need transmission. You don’t need this grid anymore because everybody will have distributed energy resources, everybody can support their own needs; well, maybe in the very, very distant future, but today we still need to rely on this big grid. But we still need to be cognizant of this opportunity and these changes. So, next one.

01:06:11 So, we’re doing a lot of work in this area. So, one of the fundamental things that will help us to integrate distribution system with transmission system: microgrids. So, today microgrids are mostly looked at as tools to improve resiliency or integrate more renewable, but the way we’re looking at microgrids as building blocks of the larger grid. So, you can look at those building blocks and build it up from individual generation source with energy storage [unclear] loads and have these multiple microgrids to form what they call network microgrids and then ultimately have the conglomeration of these microgrids supporting transmission systems.

01:06:55 What you can even do is to enable those microgrids to support local energy needs in the event of a catastrophic outage on the transmission system. And one of the big advantages of it, considering this approach, is it very well-positioned to support energy justice. It can support people at the local level who cannot otherwise to secure their own energy supply, can’t afford to deploy their own solar panels or energy storage devices.

01:07:26 But, so today we have this—the way for distributed energy resources that mostly PV, rooftop PV solar on smart buildings, but we see is coming is a lot of distributed energy storage. We’re going to have way more electric vehicles that will connect to the grid that the grid needs to support, but also those electric vehicles can provide services to the grid so they can support the grid. And the number of IOT nodes on the grid that brings another issue of cyber security. How do we make sure that it’s cyber secure? So, we look at the cyber security by design. We inject cyber security considerations in the very early stages of our work. So, next one, please.

01:08:09 So, the future where we see it is going to be true to both. We’re going to have variable, integrative, and flexible grid. And it will reach across transmission distribution and customers. It will be covering all of this. So, we’ll need to be able to operate all these resources in concept. Next one.

01:08:30 So, the next-generation electricity [unclear] this is how we call it. So, it needs to control flexible generation loads. We need to have a lot of energy storage. We need to be able to create synthetic inertia. We need to be able to support multidirectional power flow. And we need to be able to have variable grid configurations. So, some of the things that were mentioned earlier is today you have those transmission lines that have very specific grading. So, you can start introducing dynamic line rating.

01:08:59 So, we can rate those lines based on weather conditions. Then we can introduce grid-enhancing technologies such as power flow controllers. So, we can make power flow where it can, it needs to go ensure more efficient transport of this power. And then we can go to dynamic tapology [phonetic] configuration of the entire system. So, we can reconfigure a system in real time so we can have optimal configuration. We can make it similar to what internet looks like today.

01:09:30 So, today it’s more like a highway system or a water supply system, but if we have full control of our grid and we use it in the same philosophy as internet, which has what we call a local SPAF [phonetic] for data transport in internet, we can do the same, apply the same solution to the electricity grid. So, this is what we’re working on today. This is the high level. Next one, please.

01:09:56 And this is, again, I can spend probably hours on each of these bullet points, I just want to give you the visibility of what are some of the programs that we are working on to make sure that this future grid has all the technology that it needs to support this transition from what we have today to what we have in the future. And next one.

01:10:18 So, this is important. I always make sure I talk about this. So, I talked a lot about technologies, where the technology needs to go, where we think the future of the grid will look like, but technology by itself cannot succeed. In order for new technology to succeed, you need to have markets that support those technologies. These markets need to enable their policies. So, we need to have the right policies that enable the right markets, and those markets enable adoption of these right technologies.

01:10:49 So, we are working on the technology as well, I mean, all the way from basic science to commercialization, but without the right policies in place, without the right markets created these technologies will stay in the [unclear]. So, that’s why we need to work on this one. And last but absolutely not least, we cannot do it alone. That’s why we need all of you, because we need to understand what are the industry needs, how can we help, where is the gap in the industry in technology policy that the Department of Energy can step in and help and invest in this technology or support you deploying this technology with expertise, that we have fantastic national lab complex that have expertise that’s unparalleled anywhere in the world, and we can tap into these resources.

01:11:34 But, without working with you, we can’t do this. So, this is all I wanted to say today. Thank you very much, and I’ll be happy to answer questions.

01:11:45 MEREDITH: Thank you, Michael. Michelle is going to speak next and then we will come back for questions.

01:11:53 MICHELLE: Great, thank you. So, I’m going to hit the rest of the—kind of the tools in the toolbox. And I do want to—you’ve heard it over and over again, I just want to emphasize that it takes a village. This is not something that one agency, whether it be state or local or federal or private, can do alone. It takes a village. And so, today we’re talking about all the different tools and all the different ways you can build that house, we’re going talk the tools, and a house in California might look very different than a house in Maine or in Wisconsin or in Texas.

01:12:26 And so, I think that’s where you think about these. These are all the federal tools that can be combined or used with the industry, with the states, the tribes, the local utilities, and all the entities, the stakeholders out there, it’s part of a complete package. And so, when you’re thinking about this—and there’s some great questions and I encourage them to keep coming—but think of these as different tools that depending on your circumstance and your need that are available.

01:13:00 Okay, let’s talk about the first one. Next slide. So, the Transmission Facilitation Program, Pat hit a lot of the highlights of what kind of the grid resiliency, grid infrastructure, smart grid-type infrastructure bill new language. I’m going to hit the one that’s really focused on kind of that large, large upgrade. So, anything over 500 megawatts of capacity or more in a facility or a new build over 1,000 megawatts.

01:13:34 So, upgrade—500 megawatts, new build has to be a 1,000 megawatts of transmission capacity or greater in order to qualify for this program. So, this program is really looking at a lot of those issues that you heard Jigar talk about or Alejandro or others that those large-scale transmission projects that really go across regions, across multiple states, regions, whatever you want to call them, that are the large infrastructure.

01:14:04 Also, this also, the provision does include something for microgrids for Alaska, Hawaii, U.S. territories, and so it also does help support and there’s accessibility for those that are looking—those that are isolated from the main grid looking for microgrids there. This program, the Transmission Facilitation Program, has three aspects, and I think that’s what makes it complicated sometimes, but also makes it kind of good optionality.

01:14:38 So, someone can come in and look at three different ways that you can use this program. The first is the anchor customer. So, this really acts like DOE can be, act like a commercial entity that comes in and can purchase up to 50% of a project’s transmission capacity and you can sign a contract up to 40 years.

01:15:05 Now, those are kind of, as you know of any legislature, those are our guardrails, they’re up to, and so, it’s that, but this program really can come in at different ways, but it’s for those developers, and developer—I’m using very broad; it can be utilities, it can be a tribe, it can be a third party developer, it can be anybody that is developing in transmission—that is, that meets the criteria can come and ask for this type of program.

01:15:38 Now, the good and the bad is there’s only 2.5 billion in this program. I wish I had a couple of other zeroes on there because I could spend it because transmission is expensive, but it is something to help bridge. And I liked what, Jigar had that bridge, that loan, kind of the bridge to helping some of these projects especially that take years and years and years to develop.

01:16:01 It helps in that early years that with the business case you know there’s going to be, there’s a good chance there’s going to be a need for it, but in order to get them going, DOE steps in, commits to that amount of off-take—of transmission—so that the developer can get going on that project and not have to worry about is there a customer on the other end, is there enough there to get going?

01:16:30 I would say also on this one, the goal of DOE is to get in, get out as fast as we can. So, we are there to help bridge that gap until the market and the demand grows into it. Then our goal is to sell that off long-term—short-term and long-term—sell that off and so we can recycle that money and get it to the next project.

01:16:52 Second area you can request, an applicant can request is a loan. Very much like Jigar was talking on the Loan Program Office, same type of approach, a little different criteria than the Loan Program Office, but we are working with the Loan Program Office to make sure that these fit together, that they’re not fighting on each other, or confusing. And so, one of the things we’re going to do is as we put out the criteria and look at that, we’ll try to make it very clear what the difference and why a developer would need one versus the other, and we will help as well try to help place them in the right project or in the right program.

01:17:38 The third aspect you can come in and access the 2.5 billion is public private partnerships. Now, you heard some of that in the WAPA TIP, we heard Erin talk about that. So, this is basically looking at kind of nationalizing that type of approach, and you can see the bullets there, but it is something where the federal government—DOE—comes and partners with an entity that’s developing transmission and that can look a number of different ways, but there are aspects of that; just like the WAPA TIP has a couple of different aspects you can choose, this one will too.

01:18:16 Now, I did see earlier, and I’m just going to answer this now, because there was a question about are we going to see this? Is there going to be a chance for comment before the program gets stood up? And yes, especially for this one. This one is, because it’s a brand-new program, it lasts a long time; this is not one that sunsets after five years, it’s an ongoing program, and so the thinking right now, so this isn’t stood up yet, but the thinking right now and the approach right now is we would put that program structure out for public comment just to make sure this works for the industry.

01:18:51 Because that’s one of the big things all of us are trying to do is because we’re partnering, we’re partnering with states, with tribes, with developers, with kind of stakeholders, all the different type of stakeholders, we need this to be able to work in concert with their business model. And so, right now we’re setting up working on some of the aspects of—the devil is in the detail. So, there’s a ton of details we have to work through, but our plan is to put out kind of the program’s structure for comment to make sure we didn’t miss anything or we’re not designing something that doesn’t work well.

01:19:29 Next slide. So, we also in the Office of Electricity have several other tools that you will be seeing and that we have authority that were in the notice of intent, but I just wanted to hit those highlights. So, the first—so, one of them is the Transmission Needs Study and that is something, and you can see kind of in the box and the highlight that it’s really been changed a bit with the infrastructure bill, defined it.

01:20:00 This used to be a program that was just congestion, now it’s capacity constraints and congestion, and it’s on a forward-looking basis as well. So, we’re aiming for this new Transmission Needs Study to be published this summer. And so, that is—and I wanted to explain that those of you that have been around for a while and understand the program, it used to be the Congestion Needs Study, which was a current congestion look, this one will be forward-looking.

01:20:28 This will be capacity constraints and congestion. And so, it will be forward-looking. And why is this important on the study? This is a study where the secretary may designate, I’m going to read that, the national interests electric transmission corridors. And so, this is the study that you have to have first that if anybody wants to come and apply for that program, this study is the basis for the needs.

01:20:57 That’s coming. We are right in the middle of developing that, working with the labs. And that’s another thing, when we say we, a lot of times DOE, it means and the labs, because we see them as our important partner for us, and so we use very much the national labs in order to help us do the modeling and the technical approach and all that stuff, they are a vital piece of us, of what we do.

01:21:29 Next slide. So, we also have the National Transmission Planning Study and I think this is one that you’ve seen a lot, you know, a lot of talk about it. And so, you had the FURC-ANOPER [phonetic] came out last fall, looking at how do we solve some of the problems with getting transmission developed. This isn’t in response, but this in kind of concert.

01:21:58 And so, what we’ve seen a lot is that the gaps—I call it gaps—so this National Transmission Planning Study is not supposed to duplicate anything, it’s actually supposed to complement and fill in the gaps. So, one of the areas, the big gaps we hear and see is that interregional transmission and how we get those bigger lines that go over multiple regions, which also means multiple different states, rate bases, possibly ISOs, RTOs, it’s how do you find those and look at where are the areas that make the most sense to have those connections.

01:22:38 Like I said, it complements the existing processes. And it also, that will be a basis for as we look at funding and we look at applicants coming in, and it will help us do kind of that third party support, that objective analysis to say yep, we have applicants come in for like the TSP or the Transmission Facilitation Program, TFP—a lot of new acronyms out there now—that will help us also have an independent analysis that either yes, we agree, we’ve already done that and so it, as we look at projects coming forward.

01:23:17 Stakeholder engagement. This is going to take a village as well. So, this is not something that DOE just goes off in a box and then comes back and says voila, with the labs. We need the engagement. One of the areas we really want to do is use a number of different tools, and when I say “we,” it’s PNL and ENREL [phonetic], those national labs as well as DOE, as well as the utilities, the planners, the modelers, the stakeholders, and so, this is going to have a large stakeholder engagement.

01:23:49 Not only are you going to have national webinars, hopefully one coming in the next month or two to kick it off, but also technical review committees. We’re going to utilize existing convener groups as much as possible. And so, this one is going to take a village, and it’s going to be iterative. And so, we’ll consult with a number of different folks, do some runs, analysis, scenario analysis, come back, get it QC’d, tested, do these look right?

01:24:20 So, it’ll be iterative and so, this is a two-year process. It started kind of kicking off in December, but it will be a two-year process. And so, you will see opportunities for stakeholder engagement along the way. And just to let you know, this really is designed in kind of two parts here. It’s the yellow and blue additionally. It’s the baseline analysis.

01:24:45 So, it basically takes, kind from a national look, so it knits all the regions together and their plans, it says, how much in the pipeline already today? So, you do nothing, let the industry kind of flow as it is, what does that look like? That’s our baseline. And how much does that get us to our goals of decarbonization?

01:25:09 And then we look at that, kind of that system and seeing what happens if you actually add some more generation, especially the high clean energy, whether it be renewables or any of the nuclear or carbon capture or anything like that, anything that’s clean. What does that look like and can that system handle it? That’s our baseline. So, it basically starts with a base of where the industry is going today with the new transmission lines.

01:25:38 Then a big piece of this is the scenario analysis. And so, which—it’s a “what if?” Our world is changing fast. You have states with clean energy goals as well as the federal, and not all of them are the same, and so it really says each kind of different area, each region, it’s going to have a different scenario. So, your Seattle, Washington, might look very different on the solar penetration as maybe your Texas or your Florida or out south.

01:26:11 And so, this actually allows us to do a number of scenarios in order for the different regions, in order to figure out which makes sense and what investment options are least regrets. And when we say that—and I keep saying this—it’s those that when you hear the transmission planners, which are the engineers, talk about, in multiple scenarios, these type of infrastructure is needed. It’s one of these that if you invest in that, depending on if you go left or right or adjust along the way, these are kind of core infrastructure that’s needed to facilitate a number of different scenarios or different worlds that might evolve.

01:26:53 So, that’s the goal here. This also is not a one and done. Our intention is to have this as a process, and to update this, and refresh this, and work with the industry to do this, but it really is looking and seeing if you can do a national transmission planning study that’s built on the regional planning studies. And so, it’s just very important there.

01:27:24 We then offshore wind. A big topic, not only in the Northeast, but the West Coast is starting to chatter about it and trying to look at it, but offshore wind and not only offshore wind, but getting it onshore and delivering it to the consumers that need it. And so, this is one where I think there was a question earlier about partnerships and federal entities, we’ve partnered with BOEM, the Bureau of Ocean Energy Management, that we’re joint team that is really looking at all the different issues, whether it be offshore and onshore.

01:28:00 How do we get that wind, the offshore to the end use? And so, this is one it’s—we’re looking at, looking at workshops. And so, this is one that will also be iterative and lots of feedback. And so, you can see here that this is the plan, more to come on this, but this is an effort that is underway and then getting stood up. And really to think about what is the best way, in a macro looking, to get that offshore wind to the loads? Instead of just having us evolve organically.

01:28:40 And so, this really is the 30 gigawatts by 2030 large goal. And you’re existing transmission infrastructure can’t support that. So, it’s really to look at that next wave and how do we get—what’s the design of the grid that’s needed to support a goal like this?

01:29:02 So, then there’s other transmission authorities we have as well. And these are ones that some people are familiar with, some are not, but it’s good put them back in front of folks. So, the first one is the Federal Permitting Improvement Steering Council, FPISC. This is one that we’re a part of. It really is—it’s a compliance, so, it’s mandated. But this is if a developer would like to join this program. So, they get to decide if they want to join or not.

01:29:30 If they do, it really is, it helps that developer, and it could be transmission, it could be a number of different things, this is not just for transmission, but it does help bring all of the federal agencies together and help manage it, and help that—I’m talking transmission developer of course, but whoever is developing it, get through the federal process in a little more measured approach.

01:29:59 And so, just like I think WAPA TIP you saw that, they act as the lead agency, which kind of does some of the same things. This also is a one-stop shop for federal permitting as you’re trying to get through the federal permitting, whether you’re a transmission developer, generation developer, anything like that.

01:30:23 We also have kind of the lead—we lead the Integrated Interagency Pre-Application Process. That is a mouthful, and I understand why that’s acronymed, the IIP. For kind of that interstate transmission projects. And so, we do lead that, that process as well.

01:30:43 And then we also, the third area is—and I say we, DOE family—there is the section 1222 of the Energy Policy Act, which basically applies to the Western Area Power Administration, the Southwestern Area Power Administration, so that’s, again, the public-private partnership, the third-party financing to upgrade facilities, and so, that is still alive and that authority is still with us.

01:31:15 So, this is questions. I’m going to pause here and then ask Michael and Pat to come back on the screen with me because I have a feeling there is a number of questions that we’ll need to field.

01:31:30 MEREDITH: Thank you so much, Michelle. Yes, we’re going to have quite the crew to answer questions here. We’ll have Brian Mahar, who is from the Loan Program Office, Jigar had to jump off, so Brian will be joining us. We also have Hamody Hindi from the Office of Electricity. So, we’ve got the crew. So, a couple of things before we get started. We are going to be posting copies of this deck on the Building it Better Grid webpage by Monday.

01:31:59 So, everyone will have access to the slides there. It will have the contact information for our speakers today as well as some of the contact information that they mentioned as well. The recording of this webinar will be available, but it takes a little bit longer so we can ensure Section 508 compliance, so give us about two weeks on the recording. Alright, so let’s go to our Q&A.

01:32:24 The first question was about—one of our attendees asked if there was an overarching publicly available document for that IIJA provision. There is. The White House released that on January 31, and we are going to put a link to that in the chat for everyone. So, just hang tight there. Okay, the next question is for Pat or Michelle. What is FURK’s [phonetic] role in this overall effort? And how will their mandates be influenced by this overall program?

01:32:58 MICHELLE: This is the point where if we’re in a panel together, we look at each other to see who’s going to take that. So, I will start, and I will have Pat jump in. And so, FURK’s role in this is it takes the village, and it takes kind of everybody. So, we are—as we look at policies, developing kind of programs we are talking with FURK to make sure we are aligned with them, to make sure that they’re aware of what we’re doing, or processes that need to be aligned.

01:33:28 But they are involved. They are the regulator side of it. And so, we’re running the programs. But they as well as other federal entities are involved in this process. And I will turn it over to Pat to add a little more color.

01:33:45 PAT: I was going to say FURK has a very important role. I mean, if you look at the ENOPER [phonetic] processes that FURK has released, some of the things that they are looking at and addressing from a cost-allocation point of view, system upgrades, incentives, they’re going to have a critical role in that. And so, I see FURK as being a partner, as Michelle said, as part of the conversation, but a lot of the authorities, you know, that FURK has—can be an incentive for getting transmission built or help clarify the rules of the road for building transmission.

01:34:22 And that’s especially important as we think about offshore wind, as we look at cost allocation, and interconnection queues, and system upgrades. There are some issues that are going to have to be addressed as part of a progressive conversation to get transmission built.

01:34:43 MEREDITH: Alright, thank you. This next question is for Brian from LPO. Brian, have you begun to see transmission projects bundled with battery storage?

01:34:57 BRIAN: Sure. We’ve been seeing a lot of, quite a variety of different projects, and actually I can share a little bit; we’ve shared a little online about the types of projects that we’re seeing. So, I’m happy to paste that in the chat as well. But, yeah, definitely storage, transmission, virtual power plants, microgrids, you know, we’re seeing a lot in all of those variety of verticals. So, it’s definitely a very interesting category for us.

01:35:27 MEREDITH: Wonderful. Thank you, Brian. Pat, this next question is for you. What is the timeline for each program and when will grant notifications be released? How will DOE determine how to spend the funding allocated for each program?

01:35:41 PAT: That’s a lot in that question. So, let’s just say that for the programs that are required under the statute to do a competitive solicitation there is an industry component under 40101, which is the hardening provision. And so, the industry component will be done via competitive solicitation. The other half of that provision is the state formula grant. So, the funding is actually divided in half between those two types of funding mechanism, one being a state formula grant and one being an industry solicitation.

01:36:22 For 40103, that is an industry solicitation has to be executed through the states. And then 40107, which is the smart grid investment grants, those are also a competitive solicitation. So, like Michelle said, we want to be very transparent at the department. We will give early notice. We will generally follow rules of doing an RFI or a notice of intent ahead of the solicitation to give industry as much notice as possible ahead of those solicitations.

01:36:56 Now, with respect to funding allocations, the allocation is by year. So, we will have to basically do solicitations by year and formula grant allocations by year. And so, just from that perspective, that would be the general scope of what we’re thinking about.

01:37:20 MEREDITH: Okay, thanks, Pat. This is related. Who are eligible recipients for section 40107 deployment of technology to enhance grid flexibility? And could solutions including demand response or distribution energy management system technologies be eligible?

01:37:38 PAT: So, thank you very much for that question. I’m going to answer two parts. So, I’m going to back up. For 40101, the eligible for the grid hardening, the eligible entities are an electric grid operator, an electric storage operator, an electricity generator, transmission owner and operator, a distribution provider, a field supplier, and any other relevant entity as determined by the secretary.

01:38:04 For 40107, which is basically the execution of the EISA 2007 law, which was the Energy Independent and Security Act of 2007, it’s a follow-on. So, it is basically the allowable entities under the same entities that were under that original solicitation. So, it is a very open solicitation for the eligible entities underneath that. So, it’s quite flexible in who can apply.

01:38:38 Now, with respect to the question, I believe you asked on demand and demand flexibility, in section 40107, it actually amends the EISA language and includes an allowable option that includes building devices and software supporting demand, flexibility, and smart grid functions. So, that’s actually in the statute that’s an allowable expense or an allowable topic. Sorry, thank you.

01:39:13 MEREDITH: Alright, thanks, Pat. Michael, this next question is for you. I do have some things that I can add to it. They wanted a listing of storage-related programs that you had mentioned. We know that Sandia and their energy storage systems, they’ve got a website there. Also, through Energy.gov, you can get details on the Energy Storage Grand Challenge and the Long Duration Energy Storage Earth Shot, and we’ll provide those links in the final document. Anything else you want to add to that?

01:39:40 MICHAEL: Yes, so I just wanted to say a few words about Energy Storage Grand Challenge. I didn’t know if I would have time for this, so I didn’t dive deeper. So, this is the first initiative that I know of in anywhere in the industry that combined all the technologies to be able to compare them equitably. So, we’re not just looking at batteries, we’re not just looking at pump hydro, we’re looking at any technology that can provide functionality that is similar to energy storage.

01:40:08 So, which means thermal, electrochemical, it includes hydrogen, but it also includes such things as flexible generation and dispatchable loads. So, all this and, again, there is a website. You can go and look at that. I’ll be happy to talk more about this, but this is the initiative that is very widely covered, and anything that can provide additional flexibility that includes storing energy on the grid.

01:40:32 The other one, which is Long Duration Energy Storage Energy Earth Shot, this is a very specific effort to reduce the costs for long-duration energy storage and accelerate deployment and adoption. Because without this initiative, our analysis showed that we’re not going to get enough energy storage deployed in time for when it needs decarbonization. So, those are two different initiatives. They’re complementary, but they’re very different.

01:41:01 MEREDITH: Alright, thank you, Michael. This next question is for Hamody Hindi from the Office of Electricity. For the National Transmission Planning Study, how will DOE engage with stakeholders also doing study work in the transmission planning space? This includes local organizations, municipalities, ISO, RPOs, the whole group. It is important to leverage the latest modeling and planning capabilities.

01:41:28 HAMODY: Yeah, great. Thank you, Meredith. So, as Michelle was mentioning, a broad and thorough stakeholder engagement is really a cornerstone of our National Transmission Planning Study. And you can hear more about that, probably later in March we’ll have our own kick-off webinar on that. So, there’s really three pieces to the stakeholder engagement. There’s the public webinars. There’s working with existing conveners such as for example NASEO, the National Association of State Energy Offices.

01:42:02 And so that would be one avenue to get more into the DER as part of state policy there to answer that specifically. And then we’re also going to have a technical review committee as part of the engagement process, and that’s going to have three pieces. It’s going to have a governmental subcommittee. It’s going to have a technical and modeling subcommittee. And it’s going to have a land use subcommittee. And so, there will be another opportunity to get more into details about, for example, the DER outside of just engaging through the utilities.

01:42:38 And also, regarding the modeling piece, using the latest, most up-to-date modeling. We want to have also as part of the TRC consultants and industry experts and folks from academia. So, we’ll make sure we take advantage of all of the latest models.

01:42:58 MEREDITH: Alright, thank you very much. Michelle, this next question is for you. Is it possible for a transmission project to use both 40103B, grid resilience demos, and this Transmission Facilitation Program, 40106? Or would it need to be one or the other for programmatic or practical purposes?

01:43:20 MICHELLE: I’ll start and then Pat can jump on. So, let’s start with the Transmission Facilitation Program. So, that’s the second one you talked about. That does not have any requirements. Like, some programs you use that and nothing else, that doesn’t—it can be mixed and matched. So, I can see in a world where you just asked is if someone needs to harden or upgrade or kind of deal with the existing infrastructure on the network in order to help accommodate a new build.

01:43:51 You’d look at a couple of different programs in order to do that. But the Transmission Facilitation Program does not have any limitations on using this with another program. Now, other programs might, but this one does not. And I will turn it over to Pat for the hardening question.

01:44:11 PAT: So, thank you for the question, and Michelle, for your answer from the TFP program. The one thing that I will say is for the other provisions such as 40103, there’s going to be a competitive solicitation with published criteria for evaluating successful projects, just like the Department of Energy does for any solicitation that we run.

01:44:36 And so, I think folks that are considering using multiple kind of avenues are really going to have to think hard with respect to how do they meet the criteria that would be published in a solicitation or the evaluation criteria that we publish for any solicitation and having the ability for our project to meet that. And so, that will be the challenge as folks look at crossing or potentially utilizing other solicitation, say for an aspect of a project.

01:45:13 So, that is just something for consideration. And I’m not sure it’s going to be easy, but it is something that folks should think about.

01:45:25 MEREDITH: Okay, Pat. Another one for you, and I think this refers to something you talked about very early in your presentation. Is the three-year cap the total spend over the last three years or the average?

01:45:38 PAT: That’s a great question. So, I will actually read the language. Let me pull it up for a second. Okay, a grant to an eligible entity in the amount that is greater than the total amount that the eligible entity has spent in the previous three years on efforts to reduce the likelihood and consequences of disruptive events. So, it is the total amount that an eligible entity has spent in the previous three years.

01:46:12 MEREDITH: Alright, thank you. Another one for you, Pat. Will smart grid grant applications be evaluated mostly on economic impacts or also on enabling the administration’s clean energy goals?

01:46:27 PAT: So, I’m not going to get into details of solicitation content. I would ask that folks wait for us to release a notice of intent or RFI notice of intent on materials for that solicitation from that perspective. So, I’m not going to comment on specific criteria that a potential solicitation may focus on at this moment in time.

01:46:52 MEREDITH: Okay, thank you. Will HVDC lines be eligible for IIJA grants under 40101 or 40103?

01:47:05 PAT: Meredith, this is like rapid-fire questions. So, so for HVDC. Let’s talk about that briefly. For 40101, everybody has to remember, this is a hardening resilience-type solicitation. So, going back and looking at the eligible projects, an entity under the program funds may be used for activities, technology, equipment, and hardening measures that reduce the likelihood and consequences of disruptive events.

01:47:37 So, this does include undergrounding of electrical equipment; the relocation of power lines or the reconductoring of power lines with low-sag, advanced conductors; hardening of power lines; substations and other systems; and the replacement of old overhead conductors and underground cables as written in the statute. So, that is what is written in the statute for 40101.

01:48:07 For 40103, the language actually says to demonstrate innovative approaches to transmission storage and distribution infrastructure. So, a lot of flexibility in that language for 40103. Thank you, Meredith.

01:48:24 MEREDITH: Alright, I’m going to give you a moment to breathe, Pat, because this next one is for Brian from LPO. How does LPO weigh alternative solutions when selecting projects for funding?

01:48:37 BRIAN: Okay, good question. So, I think we approach things a little bit differently than our colleagues at the rest of the department. We like to say we try to do things a little bit more commercially and act a little bit more like a commercial bank. So, what we’re really looking for are projects that are ready to go that have the sort of commercial elements ready.

01:48:56 We certainly have some statutory issues that we have to cover. Does the project have innovation, and does it reduce greenhouse gases per the Title 17 statute? But, when it really comes to sort of selecting a project it really is, is the project ready to proceed as well as meeting those statutory requirements? And we do that through a pre-application consultation.

01:49:19 So, we—Jigar and myself—bring in a team of about 20 experts from across energy sectors who are here to work with projects, talk with projects, really sort of help them through the—all of our sort of application requirements, and really walk them through, hopefully, to get to a loan closing.

01:49:39 MEREDITH: Thank you, Brian. This next question is Dr. Adria Brooks from the Office of Electricity. Will stakeholders have an opportunity to weigh in on the Transmission Needs Study? Adria?

01:49:52 ADRIA: Yes, thanks so much for asking. So, we will be publishing a consultation draft of the new study for comment before its finalized. We don’t have an exact date of publication yet for that, but I would expect to hear more later this summer. So, it should be coming soon. Thanks.

01:50:10 MEREDITH: Thanks, Adria. Michelle, will local governments be eligible to apply for the Transmission Facilitation Program?

01:50:18 MICHELLE: So, I think anybody that’s developing a project. And so, I think this is a key. I don’t think, especially if you’re looking at the microgrids or if you’re looking at some of the others. So, an entity that is developing the project is eligible to apply. And so, I don’t see why they shouldn’t be. They just have to be the developer of the project.

01:50:43 MEREDITH: Okay. This next one is for you as well, Michelle. Do I understand correctly that the $2.5 billion dollars is direct funding for NIETC qualified projects? Or all others—interregional, offshore wind, etc., through finance support at the Office of Loans?

01:51:02 MICHELLE: Thank you for that question. Let me clarify. No. And so, because those slides were back-to-back, the 2.5 billion is open to any type of transmission project that is developed. It doesn’t have to be National Transmission Needs or anything like that, but it is open.

01:51:28 When I was talking about the National Transmission Planning Study, I think in the future that is our kind of third-party validation that as we get applicants that say this is the best thing, and this is why it’s needed; we’ll use that as a validation. But, no, it doesn’t have to be in that. It just helps us with that validating and that business case and the application that comes in.

01:51:52 MEREDITH: Great, thanks, Michelle. This next question is Allisa Baker from the Office of Electricity. Allisa, how do folks engage with the offshore wind integration team?

01:52:02 ALISSA: That’s a great question. So, we do have a TRC going for the Atlantic Offshore Wind Transmission Study. You can see more about that if you go to NRAL’s website. They’ve got a whole page and some contact information there. Additionally, we hope to be standing up a series of webinars in the really near future, which will give you a chance to engage in a different level as well. Once we get some of those details worked out, you’ll see notices for those go out through all of the regular channels. Follow Wind Exchange, if you’re not already doing so.

01:52:34 MEREDITH: Very good. Thank you so much. Well, that was a lot of questions. Thank you to the entire team for that. We really appreciate all of the information. So, this wraps up today’s webinar and our Q&A. Michelle, I’m going to turn it over to you for some final thoughts.

01:52:51 MICHELLE: Yes, thank you, Meredith. I just wanted to thank everybody here. So, just because it takes a village; this is a partnership. This is coming alongside. And today really was about giving a little more information about what was in the notice of intent, what these programs look like, where you can connect with folks. You’ve heard that a number of times. It’ll give you connections. We are here to help.

01:53:14 And especially if you have questions or don’t understand, as these programs either are ongoing or being stood up, if they’re in the infrastructure, we are trying to give you a list of folks you can either email or contact in order to find out more information and they can send you to the right place. And so, thank you. We look forward to this adventure. We look forward to partnering with folks in order to get to kind of the national, not only the federal clean energy goals, but also state energy goals, and just kind of decarbonize this world.

01:53:52 And make sure the needed transmission, I’m going to say that very much because Michael is right and everybody was right, there’s a number of different ways depending on the region that it takes. And so, we’re here for the needed transmission with a number of these programs to help states and developers and tribes and others get to the goal. So, thank you so much. And have—nd you can see here the contact, some of the contacts. And thank you and have a wonderful afternoon. Thank you, everyone. Bye.

01:54:24

**END OF FILE**